NOVEMBER/DECEMBER 2024

23PSPH26 — RENEWABLE ENERGY AND ENERGY HARVESTING

Shanmuga Industries Arts & Science College
T.V.Malai

Time : Three hours Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. What are the two main limitations of fossil fuels as an energy source?

2. How does ocean acidification impact the efficiency of Ocean Thermal Energy Conversion (OTEC)?

3. List the primary advantages of solar energy.

4. What is the purpose of a solar pond?

5. Discuss primary component of a wind turbine?

6. Name two types of electrical machines used in wind turbines.

7. What is the primary source of hydro energy?

8. What is the major environmental concern associated with hydro power?

9. Write the principle of electromagnetic energy harvesting.

10. List out two types of linear generators for energy harvesting.

SECTION B — (5 × 5 = 25 marks)

Answer ALL questions.

11. (a) Describe the limitations of nuclear energy.

Or

(b) Explain the working principle of Ocean Thermal Energy Conversion (OTEC).

12. (a) Describe the working principle of a flat plate solar collector.

Or

(b) Explain the concept of solar distillation.

13. (a) Explain the working principle of a doubly-fed induction generator (DFIG) in wind turbines.

Or

(b) Write note on (i) osmatic power and (ii) ocean bio-mass.

14. (a) Evaluate the technical and economic feasibility of a small-scale hydroelectric project.

Or

(b) Explain the working of plezoelectric effect.

15. (a) Explain the physics of electromagnetic energy harvesting.

Or

(b) Describe the mathematical modelling of linear generators.

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SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Discuss the technical and economic feasibility of a tidal energy project.

17. Explain solar water heating system for a residential building.

18. How wind turbine control system is used to optimise energy production? Explain.

19. Discuss the technical and economic feasibility of a small-scale hydroelectric project.

20. Give an account on electromagnetic energy harvesting system for vibration-based applications.

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